NORTH CAROLINA

DEPARTMENT OF AGRICULTURE

CANNING AND PRESERVING

BY

GERALD McCARTHY

MARCH, 1907

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CANNING AND PRESERVING.

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THE VALUE AND USES OF CANNED FRUITS AND VEGETABLES.

By a little foresight and the methods described in the following pages any housekeeper may in seasons of abundance and low prices put away against seasons of scarcity and high prices many kinds of wholesome and nourishing foods which would otherwise be largely wasted or sold for less than the cost of producing. In rural communities it is too often the case that during the colder months all the more perishable and wholesome fruits and vegetables are absent from the daily bill of fare. Thus people, and young children especially, are fed upon an improperly balanced ration, which must influence in an undesirable manner both their health and growth.

According to chemical analysis, the apple has 18 per cent solid matter and 82 per cent water, while milk has only 13 per cent solid matter, and oysters the same. Cabbage, the great stand-by of the laboring man, has only 8 per cent solid matter and 92 per cent water. Pears have about the same amount of solid matter as apples. Peaches have 20 per cent solid matter and 80 per cent water, while fresh pork has only 24 per cent solid matter. We see, therefore, that fruits are in some respects richer food than milk or oysters, and approximate to that of fresh pork.

Besides contributing sugar and mucilaginous matters as food, fruits by their acid and aromatic principles act powerfully in the capacity of tonics and antiseptics. When freely used at the stage of ripeness fruits prevent debility, strengthen digestion, correct the putrefactive tendency of nitrogenous foods, avert scurvy and increase the power of labor.

The alterative effects of fresh fruit are very great. But every species of fruit does not affect every person alike. Each person must find out by experiment which fruit is the most suitable to effect the desired end in his particular case. There are, however, few cases of diarrhœa which will not yield to pure blackberry juice. The tomato is recommended for torpid liver; the watermelon for derangement of the kidneys; the potato for rheumatism. During the vintage season in the South of France many invalids go there to drink the pure juice of the grape direct from the press. Most of these are

sufferers from nervous dyspepsia. The pure fresh juice tones up the system and sets the vital machinery to running aright. Pure unfermented grape-juice preserved in bottles according to the method described in this Bulletin is quite as wholesome as the juice fresh from the press.

CANNING AS AN ART.

There is among the general public a belief that there is something mysterious in the commercial canning process. Canners themselves try to conceal their methods under fanciful or ambiguous names. But the principles of canning are very simple, and are known and practised by every housewife who puts up a few jars of fruit from her own garden.

The theory of the canning process is based on the principle that fermentation is due to living organisms—bacteria and molds. If we heat food in a vessel closed from the air we kill all the fermentative germs within, and no more can get in so long as the package remains air-tight; thus further fermentation is prevented and the food keeps indefinitely. Some germs are difficult to kill in the spore stage. These require to be heated to not less than 240 degrees F. for one time, or to 212 degrees F. on three successive days. All the common berry fruits, peaches, apples, and tomatoes are successfully sterilized in cans by heating or "processing" one time at 212 degrees F. The use of temperature above 212 degrees F. requires a strong closed kettle, retort, or an oven.

In practical canning it is found that the open-kettle process, which does not give a temperature above 212 degrees F., is the easiest to manage and turns out the best quality of goods.

Beans, peas, corn, Irish and sweet potatoes cannot be satisfactorily canned by heating in cans to 212 degrees F. for one time, though if heated to that temperature three times on successive days they will keep well. All animal tissues, meats and fish require a temperature of 240 degrees F. to sterilize them.

All of these "high temperature" foods may be satisfactorily canned at home by heating the cans or jars in an oven. To can by this method the bottom of the oven should be covered with a sheet of asbestos board $\frac{1}{8}$ inch thick. Asbestos can be bought of most plumbers and hardware dealers. A good chemical thermometer which is capable of showing temperature up to 250 degrees F. is necessary, as in this work guessing at the temperature will not do.

Another way of easily securing a temperature higher than that of boiling water is to use a 25 per cent brine instead of plain water in the process kettle. Two pounds of salt to a gallon of water makes approximately a 25 per cent brine which boils at a temperature of about 224 degrees F. For canning the "high temperature" foods it is best to use the small size or quart cans or jars.

Of late years chemical manufacturers have been urging housekeepers, canners and dealers to use salicylic acid, borax, and many other poisonous chemicals sold under fancy and misleading names for preventing fermentation in canned foods. Their use in canned foods is wholly unnecessary, and in many States such use is illegal. The use of chemical antiseptics in food is always dangerous to health. Cleanliness, proper attention to sealing the cans and exposure to sufficient heat will preserve canned foods without the addition of any chemicals whatsoever. Not even sugar is essential to preservation of properly canned and sterilized food.

In pickling and drying meats and fish some chemical in addition to common salt is ordinarily considered necessary. The chemical most extensively used for this purpose is saltpeter or nitrate of potash. For mild-cured bacon and hams borax is commonly used in place of saltpeter. Neither of these two chemicals is wholesome or to be recommended. The substitution of pure cream of tartar or of acetate of soda for the above-named chemicals will probably give more wholesome and equally mild and long-keeping meat.

FOOD PRESERVATIVES.

Of all methods for sterilizing foods the best and most wholesome is by means of a temperature at or above the boiling point of water. During the last few years there have been invented a number of different methods of preserving foods by cooling the air to a temperature near the freezing point. By means of ice or refrigerating machines a temperature of 39 degrees F. can be maintained steadily and easily in properly insulated chambers. Meat preserved in cooled chambers retains its freshness for about eight days. After fifteen days, however, such meat begins to whiten and to contract, expelling the cellular juices and acquiring a bad taste. A few days more suffices to cover the meat with an abundant growth of molds, and to develop in the cells ptomaines or physiological poisons.

The following are the more generally used chemical preservatives:

Acetate of Soda.—Of the different chemicals used for preserving meats, probably the least harmful—salt excepted—is acetate of soda. In practice, however, this preservative has never become popular, because it requires unusually long treatment. Long soaking when the chemical is dissolved in water washes out a good part of the nutritious juice and renders the meat more or less dry and tasteless. When this chemical is used as a powder upon the meat, it also and most energetically abstracts the moisture and juices of the meat. Finally, the chemical is rather expensive for general use.

Sulphite of Soda.—Probably the chemical most extensively used for meat preservatives at the present time is sulphite of soda. This

is also largely used on canned vegetables, more especially corn and asparagus, on which it acts as a bleaching as well as a preserving agent. When used upon fresh meat, sulphite of soda gives to the meat a fictitious red color, which color remains even long after the meat has begun to decay. Mince-meat and Hamburg steak as sold on the counters of meat dealers is almost invariably colored and preserved by means of this chemical. Numerous experiments have been made by biologists to determine the effect of sulphite of soda upon the digestive organs. For obvious reasons most of these experiments have been made upon animals. When used in the quantity necessary for masking decay, sulphite of soda causes inflammation of the mucous lining of the stomach and bowels. It also produces diarrhœa, hemorrhage of the stomach, intestines and liver, and fatty degeneration of the kidneys. When used in smaller quantities in experiments upon the human body the results have been a feeling of discomfort, eructations, indigestion and headache.

Nitrate of Potash, Saltpeter.—Saltpeter is a chemical very widely used for preparing pickled or corned beef and pork. The popular impression is that this chemical is a most powerful preservative. As a matter of fact its preservative power is very feeble, being due almost entirely to its quality of absorbing and expelling the cellular juices of the meat. It renders the meat hard, tasteless, and innutritious, even more so than acetate of soda. Its real value depends upon its power of preserving the color of stale meat in a way similar to that exercised by sulphite of soda already referred to. The physiological effects of nitrate of potash are similar to those of sulphite of soda.

Formalin.—Commercial formalin—or, as it is more properly called, 40 per cent solution of formaldehyde—has in recent years come into very general use, more especially as a preservative for milk, cream, and other liquids. This substance is a very powerful antiseptic and acts as a dangerous poison to the living organs of the human body. A 15 per cent solution of formaldehyde suffices, after a dipping of three minutes, to preserve fresh meat perfectly for five days. When the immersion is extended to sixty minutes, it will preserve meat for twenty-five days. But such meat is not fit for human consumption. As this substance is very cheap and easily used, in practice it is probably the one most generally used upon the western-killed meats which show such astonishing resisting power against decay when hung up in the butcher shops of distant States.

Borax and Boric Acid.—Borax and boric acid are two forms of one chemical which possesses antiseptic powers. This chemical is, next to formalin, the one most extensively used in preserving the "commercial beef" of the big western packing-houses. It is also very generally used in curing bacon and hams. The United States Gov-

ernment has recently made some very important experiments with these chemicals upon the human body by adding to food different quantities of one or other of these substances. The results of these experiments have been summed up and published by the Bureau of Chemistry of the United States Department of Agriculture, as follows:

"The general results of the investigation show in a convincing way that even in doses not exceeding half a gram (7½ grains) a day boric acid and borax equivalent thereto are prejudicial when consumed for a long time. It is undoubtedly true that no patent effects may be produced in persons of good health by the occasional use of preservatives of this kind in small quantities, but the young, the debilitated, and the sick must not be forgotten, and the safe rule to follow is to exclude these preservatives from foods of general consumption."

Benzoic Acid.—Benzoic acid is very widely used for preserving fancy beverages, the so-called "soft drinks," and the syrups used in soda-water fountains; also for preserves, jams, jellies, and catsups. This substance occurs naturally in urine derived from the human and animal bodies. It was formerly obtained from this source by chemical treatment, but at the present time it is chiefly manufactured from products of coal-tar distillation. While this is one of the least harmful of food preservatives, it is one that no person careful of his health should swallow in any quantity except under the advice of a physician and for its special medicinal effects.

Salicylic Acid.—Salicylic acid is also a derivative of coal-tar and is chemically closely related to carbolic acid. It is a most energetic preservative and in practice is very extensively used in preserving canned fruits and vegetables. This substance has been condemned by the French Academy of Medicine as injurious to the kidneys, and its use as a food preservative is interdicted by most civilized governments.

PRESERVING VEGETABLES.

Asparagus.—The best variety of asparagus for canning is the "Colossal," although any cultivated variety may be used. The shoots should be cut to a uniform height, and may be put up either in flat tin boxes or in the ordinary quart fruit jars. If in glass jars, the asparagus should be cut so that the top of shoots come to about the shoulder of the jar. The asparagus shoots must not be washed, but each shoot should be rubbed lightly with sand-paper or a coarse cloth to remove the outer skin or epidermis. The shoots should be selected so as to place only those nearly the same thickness in one jar. To whiten the asparagus shoots, proceed as follows:

Place the trimmed and skinned shoots in a flat-bottomed vessel of sufficient size, which must be deep enough to contain the entire

length of shoot, then pour over the asparagus enough boiling water containing 10 per cent of salt to cover the shoots to one-third of their length. Let these remain so for exactly three minutes. Next pour upon the asparagus additional plain boiling water to cover the shoots to two-thirds of their length and let it remain for three minutes longer. Now cover the pan, place on fire, and let the whole boil vigorously for two minutes—making eight minutes in all. The pan must then be removed from the fire and the water carefully poured or drained off and the asparagus immediately plunged into cold water, which should be as cold as can be had. Let it remain in the cold water for one hour to remove the salt and green coloring matter. After the shoots have become white, remove from the water and drain, then place in the can or jar, being careful to keep the shoots straight. For liquor, fill the jar or can completely with brine made by boiling one ounce of salt in a quart of water. This brine should be cold before being used. The jars or cans are then sealed air-tight and processed at 212 degrees F. for ten minutes for each pound of asparagus. The processing or heating should be repeated for the same length of time on each of the next two succeeding days. If processed ten minutes at 240 degrees F. in oven, only one heating is required.

Agarics or Mushrooms.—Mushrooms for canning should be freshly gathered. The first grade is restricted to the caps alone, second choice consists of the caps and stems. Only large and well-grown types of the species should be selected for canning and only one species should be placed in the same can or jar. Prepare the following liquid: One quart of water, one ounce of salt and two teaspoonfuls of vinegar. Place all in a basin and bring to the boiling point. Into this boiling liquid throw the mushrooms to be canned, a small quantity at a time, and stir them briskly, but without bruising, until they are soaked through; then cover and give ten minutes boiling. Remove from the boiling-kettle on a skimmer or colander and plunge several times into fresh cold water. Then remove and drain. The mushrooms are next placed in the jars. For liquor use the salty, acidulated water in which the mushrooms were boiled. Close the jars air-tight and process at 240 degrees F. twenty-five minutes, or process at 212 degrees F. for thirty minutes, for each pound of mushrooms, and repeat the processing for the same length of time on each of the two succeeding days. Instead of using the liquor in which the mushrooms were boiled, the jar may be filled with hot melted butter or hot salad oil.

Cabbage or Russian Sauerkraut.—This excellent and wholesome article is much used in Russia, Germany, and Alsace. The process is very simple, as follows: Remove and discard the exterior green leaves; quarter the heads; cut out the cores and the bases of the large

outer mid-ribs. Then slice with a sharp knife, and cut into fine strips lengthwise. Weigh the cut or minced cabbage and for each pound of cabbage allow half an ounce of salt. The cut cabbage is then placed in layers in kegs, glass jars, or earthenware vessels, and on each layer is dusted salt from the portion weighed out. Complete the packing by adding enough salt to make one pound of salt for each hundred pounds of cabbage. With the portion of the salt placed on the top of last layer, mix for each one hundred pounds of cabbage one or two handfuls of juniper berries. Upon the whole place a loose cover and weigh it down with a heavy stone. When the vessel is opened to remove cabbage for consumption, enough fresh-salt brine should be added to completely cover the remaining cabbage, and the board and weight should be replaced.

Dutch or Flemish Sauerkraut.—Only red cabbage is used for this kind of kraut. Remove the outer leaves as with the Russian kraut and cut the quarters into narrow ribbons. Prepare a liquid as follows: For each pound of cabbage slice three apples, removing the cores and seeds; a few sliced onions; two ounces of butter and a tablespoonful of wine or vinegar; salt and pepper to taste, and add a few pieces of sugar. Place the whole over a low fire and allow to simmer two hours. The cooked kraut is then placed in jars and processed as directed for asparagus, but one heating at 212 degrees F. suffices. Cauliflower may also be canned by this recipe.

Green Peas.—The best varieties of peas for canning are the early wrinkled sorts, of which the Alpha and Gem are types; but late peas of the "Telephone" type are also much esteemed. For the best results the peas should be carefully sorted according to size. Usually three grades are made. The smallest grade are the best and are called "extra fine"; the next grade are "medium fine," and the largest grade are called "fine" peas. The grading of the peas can be done by hand, but when carried on on a large scale it is better to use suitable screens or sieves. The graded peas are washed and blanched before being placed in the cans. For blanching, for each five pounds of peas use five quarts of water, to which may be added a few crystals of sulphate of copper, although this addition is not necessary nor always desirable. Boil the peas briskly for nine minutes for the larger grade, seven minutes for the medium, and five minutes for the smallest peas. Remove from the fire and drain. When cold place in the cans or jars, which should be filled to within one-fourth of an inch of the top. Make a liquor of the following substances: Ten quarts of water, four ounces of salt, four ounces of white sugar, and one-eighth of an ounce of carbonate of soda. Bring this to the boiling point and then permit it to cool before pouring over the peas in the cans or jars. The larger peas, or lowest quality, may be improved in flavor by adding in the cans a few leaves of

chopped lettuce and onions. The cans or jars are then closed and processed at 212 degrees F. fifteen minutes for each pound of peas. The processing or boiling must be repeated for the same period on the next two succeeding days. A single heating in the oven or retort to 240 degrees F. for fifteen minutes will suffice. Instead of using the liquor above described, one and one-half ounces of fresh-melted butter for each pound of peas may be used.

Irish Potatoes.—Immature Irish potatoes are very palatable when canned. They are prepared as follows: Choose a roundish variety of potato, which should be just so immature that the skin is easily detached by rubbing with the thumb nail. Wash the potatoes thoroughly in cold water, then by means of a coarse cloth rub off the skin. Wash the potatoes again in cold water, to which has been added one-tenth of an ounce of acetate of soda, or same amount of tartaric acid, or cream of tartar per gallon. Heat the acidulated water and into this throw the cleaned and skinned potatoes and boil for two minutes. Remove by means of a wire skimmer—not the fingers—and throw into cold, slightly salty water. When cold place the potatoes in cans or jars and add the following liquor: One quart of cold water, two ounces of fine salt, a crystal of acetate of soda or cream of tartar. Seal the cans or jars and process at 212 degrees F. fifteen minutes for each pound of potatoes. Repeat the processing for the same period on the two succeeding days. A single heating in oven to 240 degrees F. for fifteen minutes will suffice. In removing the cans or jars from the kettle be careful not to shake or knock them about, as the potatoes are liable to fall to pieces while they are still warm.

Sweet Potatoes.—Best varieties to can: Yellow Nansemond, Jersey Sweet, Southern Queen, and Vineless. Wash and boil the potatoes until the skin cracks. Peel and slice or quarter. Pack solidly in quart cans or jars. Use no liquor. Process in oven twenty minutes at 240 degrees F., or three times on successive days at boiling temperature.

Tomatoes.—For canned tomatoes, the best varieties are those of the more solid kind, such as the Beauty, Stone, Champion, Royal, and Trophy. The tomatoes should be freshly gathered, of only medium size, and as smooth and regular as possible. They must be fully ripe, but not overripe, nor with cracked skins. The tomatoes are first scalded with boiling water until the skin cracks, then peeled and, without further treatment, packed solidly in cans or jars. For liquor use water, to which for each quart add two ounces of salt. This brine should be boiled and cooled before adding to the cans or jars. Seal the cans or jars air-tight and give thirty minutes boiling at 212 degrees F. Where fruit of the proper degree of ripeness is used, and great cleanliness is observed in the handling, it is not necessary to process tomatoes more than once nor to use a temperature above 212 degrees F.

TOMATO SAUCES.

For making sauce, tomatoes that are too ripe or too large or irregular for canning whole may be used. Green or imperfectly ripened tomatoes cannot be used for this purpose. Remove the stems and skins and place the tomatoes in a porcelain or tin-lined kettle. For each hundred pounds of tomatoes use two pounds of salt, one pound of chopped onions, four chopped green peppers and a few chopped peach or cherry leaves. No water is added. Allow them to simmer in their own juice, with frequent stirring to prevent burning, until the whole is reduced to a smooth mass. The cooked mass is then run through a colander to remove hard particles, and all that cannot be passed through a colander must be rejected. The smooth paste thus obtained is returned to the fire and permitted to evaporate down to about two-thirds of its original volume. It is then placed in cans or jars and processed at 212 degrees F. five minutes for each pound of sauce.

Albemarle Souce.—Tomatoes (skins off), one peck; cinnamon, one ounce, pulverized; mace, one ounce, pulverized; allspice, one-half ounce, pulverized; cloves, one-fourth ounce, pulverized; mustard, one ounce, pulverized; salt, one gill; vinegar, two quarts; onions, two ounces; peach leaves, one dozen; sugar (white), one-half pound; red pepper, one ounce, pulverized; black pepper, one ounce, pulverized; celery seed, two ounces; mustard (white, unground), one ounce. Cook the tomatoes; strain them; add the spices and heat to boiling; when quite cool, add six fluid ounces of old Jamaica rum, or in its lack corn whiskey.

TOMATO PICKLES.

Sweet Tomato Pickles.—Slice one peck of green tomatoes and two good-sized onions, sprinkle over them a cupful of salt, and let stand twenty-four hours. Drain and add two tablespoonfuls each of ground allspice and ginger. Put into a preserving kettle with two pounds of sugar, and vinegar enough to cover; simmer until they look transparent. Bottle and seal tight.

Green Tomato Pickles.—One peck of green tomatoes, sliced; one dozen onions, sliced; one ounce of whole cloves; two ounces of mustard seed; one-fourth pound of ground mustard; one and one-half ounces of black pepper. Put a layer of tomatoes, then a layer of onions, then a sprinkling of salt, then another layer of tomatoes, and so on. Let stand over night; the next morning strain off the liquor, put the tomatoes in the preserving kettle with the other ingredients, cover with vinegar and simmer gently fifteen minutes. Put away in stone or glass jars, and seal tight.

TOMATO CATSUP.

Take one peck of ripe tomatoes; put them in a kettle; boil one hour; take them out; press and strain the pulp through a sieve; put it into a kettle; add six large onions, grated; four tablespoonfuls of brown sugar; one tablespoonful of ground mustard; one tablespoonful of salt; one teaspoonful mace, pulverized; one teaspoonful of cloves, pulverized; one teaspoonful of black pepper, pulverized; three pods of green pepper, cut fine. Mix the seasoning with the pulp; let it boil five hours; stir frequently; just before taking it from the fire, stir into it one pint of strong vinegar. When cold, put into bottles and seal.

DRIED TOMATOES.

In Spain tomatoes are more frequently preserved by drying than by canning. The ripe tomatoes are simply cut in halves and on each cut surface is placed a pinch of salt. The tomatoes are exposed to the direct sun on trays made by tacking cheese-cloth on frames. These trays are elevated some feet above the ground. The trays are taken in or covered up each night. It usually requires eight or ten days to dry tomatoes. When dried they may be packed in vessels of wood or tin until wanted for use. To prevent insects fouling the drying tomatoes, cover with mosquito-netting held a few inches above the fruit.

CUCUMBER PICKLES.

The best pickles are made of gherkins. If ordinary garden cucumbers are used they should be gathered when about the size of the thumb. A keg, barrel, vat or earthenware jar must be provided for brining. The vessel should have a spigot at the bottom, and should be elevated upon a block or a stand. The vessel should be thoroughly cleaned and scalded. The gherkins or cucumbers as they are brought from the field and as soon as possible after gathering are, without any washing or preliminary treatment, thrown into the pickling vessel. Prepare a brine containing for each gallon of water one pound of salt. Heat this to the boiling point and allow to cool before pouring over the cucumbers. Allow this brine to stand on the cucumbers for two or three days or until it begins to turn white on the surface. Then open the spigot at the bottom, or if there is no spigot turn down the pickling vessel and allow the brine to drain away. Then wash the pickles and the inside of the pickling vessel very carefully and thoroughly with clean, pure water which has been boiled and cooled. Recover the pickles with a ten per cent salt brine made as before. To this second brine for each four gallons of water add one-half ounce of acetate of soda. Close the vessel tightly and place away in a cool, dark cellar. The pickles in this brine will keep

indefinitely. When wanted for use they must be soaked for twenty-four hours in running water or in cold water changed every two hours. A better and more satisfactory pickle is made by soaking the pickles, after the salt has been removed, in ordinary cider vinegar for seven or eight days. They are then removed from this vinegar and placed in vessels from which they are to be consumed or otherwise disposed. In this vessel they may be mixed with small white onions, a little thyme and a few cloves of garlic, and then covered wholly with fresh vinegar heated nearly to the boiling point, but not boiled. To this vinegar may be added 10 per cent of pure white sugar. The pickles are then ready for consumption.

VARIOUS PICKLES.

In the same manner above described for cucumbers or gherkins many other species of garden vegetable may be pickled, especially the following: red cabbage, cauliflower, carrots, white onions, green peppers, green snap beans, green tomatoes, beets, and capers.

CHOW-CHOW.

Four quarts of chopped cabbage; one quart of chopped onions; two ounces of ground mustard; one ounce of ginger; one-half ounce of cloves; one-half ounce of mace; one-half ounce of cinnamon; one ounce of celery seed; three ounces of turmeric powder; three pounds of sugar; four quarts of green tomatoes, chopped fine; four chopped green peppers; three tablespoonfuls of salt. Cover with vinegar; mix thoroughly and process at 212 degrees F. for ten minutes. Bottle and seal.

MIXED VEGETABLES OR JULIENNE.

Select the following vegetables in the weights given: Carrots, ten pounds; turnips, six pounds; cabbage, five pounds; green peas, five pounds; leeks, one pound; snap beans, one pound. Hash these vegetables and mix thoroughly. Blanch the hashed mixture according to the method already described for green peas. Cool in cold water and immediately place in the cans or jars. For liquor use hot melted butter. Process at 212 degrees F. for twenty minutes for each pound of vegetables.

DRIED JULIENNE.

Instead of canning the julienne mixture it may be dried in the sun or otherwise evaporated, after removing from the blanching bath.

PRESERVING FRUITS.

Apricots, Cherries, and Plums.—Apricots should be well grown and perfectly sound, but not completely ripe. The fruit may be pitted or not, as desired, but usually apricots are canned whole and

unpitted. The fruit is washed for three minutes in pure boiling water and is then by means of a skimmer or a silver fork removed from the vessel and placed in the jars or cans. The fruit must not be touched with the fingers after having been scalded, nor with a steel fork or knife. The cans having been packed as solidly as possible, the interstices are filled with a sugar syrup of 20 per cent. The jars are then sealed and processed at 212 degrees F. for twelve minutes for each pound of fruit. The jars after being removed from the processing kettle should be cooled as quickly as possible. Usually one processing is sufficient. Plums are canned in the same way as apricots. Red cherries are also canned by the above formula, but as they will lose some of their color, the syrup is to be colored by means of a little tincture of cochineal, which substance is an animal product and not unwholesome. It can be bought at any drug store.

Peaches.—Peaches for canning should be fully grown, but not perfectly ripe. The fruit may be canned whole or halved. If halved, remove the pits, but crack a few of these and add them to each jar to give flavor. The fruit should be selected so as to get only the one size in same can. The fruit should be peeled. Scald until skin cracks, then peel with silver-plated knife. For a blanching liquid use boiled and cooled water, acidulated with the juice of a lemon. They should be allowed to remain in this liquid for six to eight hours. Then without additional washing, and without touching with the fingers, with a wooden or silver-plated spoon pack in the cans or jars. Cover with a syrup containing 15 per cent to 25 per cent of sugar, close the jars and process at 212 degrees F. ten minutes for each pound of fruit. Remove the vessel from the processing kettle and cool as quickly as possible. No second processing is required for peaches.

Strawberries.—Strawberries for canning are hand-picked to avoid leaves and trash. All stems and hulls must be removed. The berries are then placed in a porcelain vessel and covered with a cold 25 per cent sugar syrup, which is allowed to remain on them for twelve hours. By means of a strainer or any suitable utensil, remove the fruit from syrup and place in the cans or jars without touching the fruit with the fingers. Fill the cans as tightly as possible without mashing the fruit and then pour upon them enough of the cold syrup in which they have been soaking to completely fill the can. Close the can and process at 212 degrees F. for ten minutes for each pound of fruit. A little tincture of cochineal may be added.

Huckleberries, or Blueberries.—Make a syrup of one quart of water and one pound of sugar. Let it come to the boiling point. Fill the jars solidly and pour hot syrup over them. Process as for strawberries.

Blackberries.—Sweeten a little, but add no water. Fill jars and process as for huckleberries. Use no liquor.

Apples.—For canning select a variety with firm spicy flesh and not over-ripe. Apples must be pared and the core removed, and may be quartered or not. Without further treatment place the fruit in the cans or jars and cover with a 25 per cent sugar syrup. To give additional flavor a little orange, citron, or lemon peel may be added. The cans are then closed and processed at 212 degrees F. ten minutes for each pound of fruit. Pears are treated in the same way as apples, but they are first to be blanched. Green ginger-root is preferred for flavoring pears.

Canteloupes.—Melons for canning should be not completely ripe. The skin or rind and the central pulp must be removed. The melon is then sliced and allowed to macerate for twelve hours in its own juice, covered with a mixture of granulated or powdered sugar and grated nutmeg. They are then, without further treatment, to be placed in the jars and covered with the juice in which they have been macerating. This juice should contain about 25 per cent of sugar. The jars are then closed and processed ten minutes for each pound of fruit. Squash and pumpkin when prepared by this recipe are excellent.

Figs.—Figs for canning must be fully ripe and freshly gathered. Let them macerate for twelve hours in a 25 per cent sugar syrup. Then, without touching the fruit with the fingers, with a wooden or silver-plated spoon remove from macerating dish and place in the jars. Heat the liquid in which they have been macerating to the boiling point and pour over the fruit in the jars. Should there not be enough of this liquid for the purpose, use a boiling hot 25 per cent sugar syrup. Close the jars and process for ten minutes at 212 degrees F. for each pound of fruit.

Dried Figs.—Figs, particularly the Brown Turkey variety, are easily dried in sunlight or in an evaporator. The fruit must be dead ripe. When about two-thirds dry, work and squeeze the figs between fingers to make them soft. Then flatten them and complete drying. Pack in boxes with a sheet of brown paper between layers.

Kaki or Japan Persimmon.—Kakis are canned in the same way as peaches, but are first to be peeled and the seeds removed. A 20 per cent sugar syrup is sufficient.

UNFERMENTED FRUIT JUICES.

Grape Juice.—To make wholesome unfermented grape juice that will keep well requires correct manipulation and careful attention to cleanliness during the process. Grapes for this use should be fully ripe, but not over-ripe. All imperfectly ripened berries and all berries showing disease should be picked out before crushing. After

crushing the fruit the entire mass should be heated to from 150 degrees F. to 165 degrees F., but not higher than 165 degrees F. A double-jacketed kettle or one with the vessel containing the grapes set inside a larger vessel containing water should be used for heating. Cook the crushed grapes with frequent and vigorous stirring for two hours. The fruit should then be removed from the fire and strained through a thick cloth into the bottles in which it is to be preserved, or if more convenient it may be run from the strainer into large glass carboys holding not more than five gallons. These must be previously washed out with boiling water and should be as hot as the juice is when ready to be filled. The vessels, whether large or small, must be filled until the juice begins to run out at the opening, and then corked tightly and the cork covered with wax to make it air-tight. If the juice is run at once into small bottles no further manipulation is required. If it is temporarily stored in large vessels, when wanted for consumption it must be once more heated to near 165 degrees F. and strained through cloth into the bottles. When the storage vessel is opened the entire contents must be removed at once. If allowed to remain twenty-four hours in a partly filled vessel the juice will begin to ferment. This fermentation may be stopped at any time by heating the juice to 165 degrees F., but the character of the liquid as unfermented wine is lost and cannot be recovered. It is of the utmost importance that the juice be heated to 165 degrees F., and no more. If heated much above 165 degrees F. the albumin of the juice will coagulate and greatly decrease its nutritive properties, and the natural taste of the juice will be spoiled. If heated to less than 160 degrees F. the ferment microbe will not be killed, and the juice will soon begin to ferment. To insure the proper temperature in the kettle a tested dairy thermometer, costing about ninety cents, should be allowed to float on the juice. In this matter guess-work will not do. Never, under any circumstances, add sulphite of lime or other preservative to fruit juice. Sugar is unnecessary, and should not be used unless the grapes are unripe. Keep the bottled juice in a cool, dark place.

Cherry Juice.—The wild black cherries of the woods are better flavored and make juice superior to that of the cultivated sorts. The pits must be removed. To twenty pounds of the fruit add five quarts of water. Place the whole in a porcelain-lined kettle over a slow fire and simmer until reduced to a paste. Then drain or squeeze the juice out by means of a thin cloth bag and fill at once into bottles. Use ordinary wine-bottles, which have been previously washed and boiled. Fill completely with juice, but do not cork. The bottles are then placed in a hot-water basin and boiled for three minutes. The corks to be used for closing the bottles should have been previously boiled for five minutes, and then, fresh from the

boiling water, are driven down into the neck of the bottle so as to be even with the opening. The bottle should be cooled quickly, but not exposed to a draft of air, and two days afterwards the surface of the cork covered with melted wax or paraffin. Store in a cool, dark place.

Quince Juice.—For making quince juice, usually only the skins and cores of this fruit which have been accumulated in making quince jelly are used. To twenty pounds of quince parings, cores, etc., add ten quarts of water. Place the whole into a porcelain-lined kettle and set over a low fire; simmer and stir until reduced to a paste. The juice is then squeezed out, sweetened if desired, and bottled. Process at 212 degrees F. as already described in the case of cherries.

Strawberry Juice.—For strawberry juice select well-ripened fruit, crush with a wooden pestle and for each twenty pounds of fruit add three quarts of water. Let simmer one hour, then strain and squeeze the juice out and fill at once into bottles, which are to be processed at 212 degrees F. for four minutes.

Apple and Pear Juice.—Apple and pear juice may be prepared from skins and cores in the way described for quinces, but it is best to use juice expressed from the whole fruit, and only the more highly-flavored varieties of these fruits.

Fruit Puree.—Instead of squeezing out the juice and discarding the solid part, when the entire fruit is used the pulp may be cooked in a porcelain-lined kettle until soft, then forced through a colander. Sweeten if desired, and can hot. Process ten minutes at 212 degrees F.

Fruit Syrups.—Fruit syrups are made in the same way as fruit juices, but they are evaporated over a low fire to one-half original volume. To the concentrated juice add one-half as much brown sugar as there is juice by measure. The syrup must be strained before putting in bottles. Process ten minutes at 212 degrees F.

Marmalade and Fruit Butter.—The lowest grade of sound fruit may be worked up into marmalade and fruit butter. The apparatus needed for this work is very simple. Apples, quinces, and pears must be sliced or chopped, but need not be peeled or cored. Place the chopped fruit in a porcelain-lined kettle and cover with juice of the same fruit. Plain water will do, but this entails more work in evaporating the water. Boil until the fruit becomes soft enough to be easily run through a colander. Pass through colander to remove seeds, skins, and cores. Add sugar to taste. The amount of sugar required depends upon the variety, natural sweetness, and ripeness of the fruit used. Usually in making apple marmalade, to every 100 pounds of apple paste from the colander 30 pounds of brown sugar is added. Cook again until the marmalade is reduced to desired consistency. Usually 100 pounds of fruit and 8 gallons of fruit juice, to which is added 40 pounds brown sugar, make 110 pounds finished marmalade.

Fruit butter differs from marmalade only in being spiced and using 20 pounds of sugar or 2 gallons of molasses, with cinnamon to suit, to 100 pounds fruit. Both these products keep well in ordinary covered wooden pails, if kept in a cool, dark place, but it is safer to preserve in fruit jars or tightly-covered wide-mouthed bottles.

FRUIT JELLIES.

The following recipes for making jelly and fruit pastes are mostly from French sources.

The varieties of fruit most suitable for jellies are the apple, pear, peach, strawberry, gooseberry, currant, and quince.

Apple Jelly.—For making apple jelly select only highly-flavored varieties. Crab-apples make better jelly than the standard varieties. The jelly may be either made from fresh juice or from juice which has been canned or bottled as described in the previous chapter. The fresh juice is, however, much the better. For apple jelly take ten pounds or one gallon of juice and ten pounds of sugar. A little orange juice will improve the flavor and a little lemon juice helps to jellify. The sweetened juice thus made is cooked over a low fire until the mass is reduced to two-thirds of the original volume. It is then placed in wide-mouthed jars and permitted to cool before being sealed. It may be kept in tumblers with the top covered with waxed paper. Jellies are not processed.

Pear Jelly.—Make pear jelly in the same way as apple jelly.

Quince Jelly.—Four quarts of quince juice, or use one-half quince juice and one-half apple juice; eight pounds of sugar. Cook this over a low fire—skimming off the scum—until reduced to two-thirds of the original volume. It is then placed in jars or tumblers, which should be filled to the very brim, as quince jelly always contracts on cooling. The jars should not be sealed until two days after placing the jelly in them.

Peach Jelly.—For peach jelly use only full-ripe fruit. The fruit must be peeled and pitted. The fruit is then to be pressed and the juice used as follows: eight quarts of peach juice; three quarts of apple juice; ten pounds of sugar; and juice of two lemons. Let this cook over a low fire until reduced to two-thirds its original volume. Skim off all scum. Place in jars and allow to solidify before sealing.

Strawberry Jelly.—Strawberry jelly is made by the last recipe, but will be much improved in quality by substituting pineapple juice for the apple juice given in the recipe.

Currant and Gooseberry Jelly.—Take six quarts of juice of red currants; two quarts of juice of white currants; two quarts of strawberry juice, and twenty-five pounds of sugar. Cook slowly until reduced to two-thirds of the original volume. When completely

cooked, add enough solution of cochineal to give a desirable color and carefully skim off all scum. It is then placed in jars and allowed to solidify before sealing. Straight gooseberry jelly may be made by the same recipe.

Cherry Jelly.—Take five quarts of juice of black or red cherries; five quarts of apple juice; five teaspoonfuls of cherry-laurel water and twenty pounds of sugar. Cook the mixture until reduced to two-thirds of the original volume, and carefully skim off all scum. Before placing in the jars, if the color is not satisfactory add a little of the tincture of cochineal.

In the making of all kinds of jelly, in order to determine when the fruit is sufficiently cooked, let fall a drop of the cooking mass upon a cold plate. If the drop remains round when cool the jelly is sufficiently cooked. In all cases the jars in which the jelly is placed for preservation should remain uncovered from twenty-four to forty-eight hours. The surface of the jelly should then be covered with either the ordinary Mason can covers or with a round of clean white paper moistened in whiskey or alcohol, and over this should be placed a piece of glazed paper, or, what is better, a circle of the parchment paper used for wrapping butter. Bend down the edges and tie around jar with a string. Store jellies in a cool, dry, dark place.

FRUIT PASTES.

In the making of fruit pastes or confections only fresh fruit can be used. The principal operation in making these confections consists of cooking the fruits in sugar syrup. The cooking must be done exactly right or the quality of the confection will not be good. In preparing the syrup it is first heated to a temperature slightly below the boiling point and kept there until the syrup begins to thicken. The proper point or "first stage" of syrup may be determined by moistening the finger in fresh cold water and plunging it into the syrup. Withdraw the finger and immediately plunge again in cold water. If the syrup has arrived at the proper degree of cooking, a light granular envelope of crystallized sugar will remain around the finger. When the syrup has reached this condition the fruit may be introduced. The temperature should not be increased. From time to time a little of the cooking paste should be removed with a spoon and with the fingers of the other hand draw it out from tip of the spoon into a string. When the paste has become so thick that it will draw out into a long string, it has reached the "second stage" and the cooking of the confection is done. The confection must then be removed from the kettle and at once placed in jars and sealed. Jelly jars or tumblers are used. No after processing is required.

Confection of Apricots.—Choose thoroughly ripe fruit, scald, peel, and crush; take of the pulp six pounds. Add to this six pounds of

sugar. First stir the sugar into the juice obtained from the fruit in the crushing process. Heat to the "first stage" above described. Then add the fruit pulp, mix thoroughly and let simmer about half an hour until reduced to the "second stage" above described. In case not enough juice is obtained in crushing the apricots, apple juice or plain water may be substituted.

Confection of Pears.—Pear paste is made in the same way as apricot paste; but the juice used to boil the sugar to the "first stage" should be obtained from fruit specially pressed for the purpose, and the pulp from which this fruit juice has been extracted should be discarded. The pear juice should be evaporated to about one-third its original volume before the pulp is introduced.

Strawberry Paste.—Take two quarts of apple juice and in this cook nine pounds of sugar. When this syrup has been cooked to the "first stage" introduce into the syrup four and one-half pounds of uncrushed fruit and enough tincture of cochineal to give the paste a desirable color. Cook and stir until the fruit is reduced to a pulp and will string out as already explained, then at once place in jars or tumblers.

Peach Paste.—Choose thoroughly ripe peaches of a variety having a spicy flavor. Peel, pit, and crush them with a wooden pestle. For two quarts of juice use nine pounds of sugar and cook until it reaches the "first stage" above described. Then add four and one-half pounds of peach pulp and let it cook until the mass will string. Then place in jars.

Mixed Fruit Paste.—For a mixed fruit paste one can use almost any desirable mixture: for instance, peach, pear, apple, cherry, strawberry, fig, etc. Crush these and with the juice of the mixed fruits or of any part of the mixture make a sugar syrup and cook until it reaches the "first stage" above described. Then add the fruit and cook for about one-half hour. At once place the fruit in jars and add sufficient clear sugar syrup cooked to "first stage" to completely fill the jars. The jars must then be sealed air-tight and processed at 212 degrees F. as for canned peaches.

Rhubarb Paste.—For this confection either red or green rhubarb stalks may be used. The stalks are cut into small pieces and placed in a porcelain dish or jar and covered with an equal weight of white sugar. The rhubarb is allowed to macerate and absorb the sugar for one night. Next drain off the juice and place it in a porcelain-lined kettle and cook until reduced to the "first stage" already described. Then introduce the pieces of rhubarb and cook until the syrup is reduced to the "second stage." As the rhubarb will have lost most of its own color during the cooking, if green rhubarb has been used, the color may be restored by means of a little mixed indigo and saffron. If the red variety of rhubarb has been used, color with a

little tincture of cochineal. This confection when cooked should be immediately placed in jars and sealed. It will require no further treatment.

CANDIED FRUITS.

Candied fruits are made in much the same way as fruit pastes, but the fruit is not crushed, but cut into halves or quarters. Pits and seeds are rejected. Use a plain sugar syrup—a pound of sugar in a half pint of water. Cook below 212 degrees F. until it reaches the "first stage." Add the fruit, which must be fully ripe and peeled. Let simmer until fruit looks transparent or "second stage" is reached. Then remove fruit and place in a single layer on a pan and place this in a moderately hot oven until syrup has hardened and the fruit looks dry and glassy.

BRANDIED FRUITS.

The principal fruits preserved in brandy or alcohol are apricots, cherries, peaches, plums, pears, and melons. For this method of preservation all fruits must be thoroughly ripe, but not over-ripe or damaged. The fruit should be gathered before sunrise in the morning and permitted to dry in the shade for some hours. There are two extensively used commercial methods of procedure: For making goods of only ordinary quality it suffices to simply take the fruits after they are collected and dried as above mentioned, and pack them in any clean barrel or jar and cover with 50 per cent alcohol, or ordinary brandy or whiskey, heated to a little below boiling point. The barrels or jars are then closed tightly and the fruits permitted to macerate in the alcohol for four or five months. They are then spiced and are ready for consumption.

The second process, which is more satisfactory for preparing a high-grade product, is as follows: The fruit is first blanched according to the method given below. It is then cooled and permitted to drain. Then cover with a hot mixture of equal parts of 28 per cent sugar syrup and fifty per cent alcohol or ordinary brandy. By this process the fruit will be ready for consumption after about two months aceration in the liquor.

The following are special recipes for preparing the highest grade of brandied fruits:

Apricots and Peaches.—Select smooth, well-shaped, perfectly ripe fruit. Puncture with a copper or silver-plated fork. The pits are not removed. The fruit is blanched by throwing into hot water containing one per cent of cream of tartar and permitted to simmer slowly for ten minutes. Then remove, without touching with the fingers, and throw into ice-cold water, where the fruit is allowed to remain for ten minutes. Drain and pack solidly into jars in which

they are to be preserved. Cover with alcohol of 50 per cent, or brandy, and spice with cinnamon or nutmeg if desired. Allow to macerate for fifteen days. At the end of the fifteen days remove the fruits from the alcohol and permit them to drain. While draining, prepare a syrup containing 28 per cent of white sugar. Take equal parts of alcohol, at 50 per cent, or brandy and the sugar syrup especially prepared for the purpose; heat to 200 degrees F. and with it cover the fruit in the bottles or jars. If the Mason jar is used, the cover must be made so tight that the alcohol or brandy will not evaporate. There is no danger of the fruit spoiling so long as the alcohol does not evaporate. If corks are used cover top with wax or paraffin.

Pears.—The best pears for this purpose are the Duchess, Bartlett, Keiffer, and Sekel; but any good dessert pear may be used. Peel and prick with a silver fork or wooden skewer. Quarter the fruit if large, or leave entire. To blanch, throw them into hot water containing one per cent of cream of tartar and permit them to remain ten minutes. Then plunge into pure cold water for ten minutes. Remove from the water and drain slightly, then cover with a 28 per cent sugar syrup and permit them to macerate twenty-four hours. Place the fruit in the jars in which they are to be preserved and cover with a hot (200 degrees F.) liquor made of two-thirds of a 28 per cent sugar syrup and one-third 50 per cent alcohol or whiskey or brandy. Close the jars or bottles and let them macerate in this liquor for two months, when they are ready for consumption.

Cherries.—The best cherry for this purpose is the Montmorency. The stems are removed and the fruit pricked with a silver fork or skewer and at once placed in jars without blanching. For a pound of fruit add one and one-half ounces of white sugar and then cover the fruit with 50 per cent alcohol or brandy. Allow them to macerate for one month, when they are ready for consumption.

Canteloupes.—Brandied canteloupes are prepared in exactly the same way as pears. The best sorts are the small, netted "Gem" varieties. The fruits are sliced or halved, and the rinds and the central pulp removed.

Figs.—Select thoroughly ripe figs of medium or large size. These need not be pricked, as there is already a central opening. Arrange the fresh figs in the jars in which they are to be preserved and cover with 50 per cent alcohol or brandy and permit to macerate for three weeks. After this period remove the alcohol, heat to boiling point and add to it one-third of its volume of a 28 per cent sugar syrup. Spices—cinnamon, cloves, or nutmeg, may be added, if desired. Macerate again for two months, when they are ready for consumption.

WINE AND CORDIALS.

For making sound, wholesome wine the following apparatus and materials are required:

Sound grapes, fully ripe, but not decayed.

Clean vessels of suitable size for crushing, fermenting and storing the juice. These vessels may be of wood, tinned iron, glass or earthenware.

A saccharometer.

A floating or "dairy" thermometer.

A clean, odorless paddle or rod for stirring the juice.

Dippers, pails, hose, faucets, etc.

For home use we recommend making only dry red wine. White wine is very difficult to keep without "fortifying" it with alcohol, and fortified wines are not wholesome.

To make red wine the ripe grapes must be crushed in a vessel having holes near the bottom to allow the juice to run into another vessel placed below. Crushing may be done by means of a wooden pestle or any suitable device. It is usually best to crush the stems of the grape bunches with the berries. These stems contain a large amount of tannin, which substance is necessary for a long-keeping wine and is rather lacking in the berries, especially in grapes of the scuppernong type. The crushed grapes are at once put into the fermenting vat, which should be small, or not larger than a barrel. A weighted frame or porous cover is put over the crushed grapes to hold them down below the surface after fermentation has begun. The vat is then filled to within not less than 20 inches of the top. Fermentation will set in spontaneously within twelve hours and will become violent within thirty-six hours. It is usually completed within ten days. The temperature of the juice or "must" at the beginning of fermentation and during the entire process is a matter of very great importance. Ignorance of this fact is the main cause of the poor quality of most home-made wine. The temperature at the start should be less than 60 degrees F. If necessary, ice should be used to reduce the temperature of the fresh juice. For each degree of sugar shown by the saccharometer the temperature of the fermenting juice will be raised about 1 degree F. But the yeast plants themselves are paralyzed at a temperature of about 95 degrees F. If we start with a juice at 75 degrees F. and the juice shows 25 degrees on the saccharometer, the maximum temperature attained before completion of fermentation will be 100 degrees F. This will absolutely kill the yeast plants, and we will have a "stuck" vat. If we start with an initial temperature of 60 degrees F. the highest temperature reached will be 85 degrees F., which is well within the limit of safety. If for any cause the temperature of the fermenting vat passes 85

degrees F. the juice must be at once cooled. This may be accomplished most easily by aerating the juice. A vigorous stirring will often suffice. Pouring the juice from one vat into another will do it. Keeping the outside of the fermenting vat wet will also help reduce the temperature. Finally, ice may be added to the vat, but this introduces an impurity into the juice and is not desirable. In order to keep the temperature down, small fermenting vats are preferable to large ones, as they offer greater surface for evaporation. If a vat gets "stuck" and fermentation ceases before all the sugar in the juice is transformed, it can be revived and finished by pouring the contents of the "stuck" vat into another vat in such a way as to thoroughly aerate the juice. To the new vat must be added one-fourth its capacity of fresh unfermented juice, and if practicable a quart or so of violently fermenting wine from another vat.

In hot climates or seasons the best plan is to gather wine grapes in the late afternoon, expose them in shallow layers to the night air. This will usually cool the grapes to a safe starting point, then rush the crushing and fermenting. Fermenting vats should always be kept in a cool cellar, which must be dry and well ventilated.

The completion of the fermenting process is indicated by the cessation of bubbles of carbonic acid gas to rise. When bubbles become rare, if your vat has not overheated and "stuck," the main fermentation is over and the new wine should at once be drawn off the pomace and lees. Have ready a clean, well-scalded vessel of nearly same size as the fermenting vat. In this should have been burned a little sulphur, or a strip of muslin saturated with fused sulphur. Fill this vessel completely with the new wine and place a grape leaf or loose cover of any kind over bung. Let stand thus in a cool place until no more bubbles of carbonic gas rise to the bunghole. Then drive in the bung as tight as possible, first filling the barrel, if necessary, until the liquid runs out at bung. Let it stand so with least possible disturbance for one month, then rack off into a fresh barrel, clean and sulphured as before. If at this racking the wine is still turbid it must be "fined." To "fine" red wine take the whites of six perfectly fresh eggs for one barrel of wine. Beat to a foam, add a tablespoonful of fine salt. Mix the whole with a quart of wine drawn from the barrel to be "fined." Stir into the barrel and roll it about to thoroughly mix. Let the barrel now stand another month tightly bunged and completely filled. Rack again, and if the wine is sound it should be perfectly clear. After this the wine must be racked twice a year so long as it remains in the wood.

Red wines are usually not fit to drink until two years old. If wanted to keep longer than this the wine should be bottled when two or two and a half years old. In bottle it will keep as long as desired. No preservative is needed if wine is made as above described.

If the wine seems to have gone wrong in any way, a good-sized pinch of dry mustard powder will prevent a barrel from spoiling. But this will give more or less objectionable taste to the wine.

Sparkling wine cannot be well made at home, and its manufacture is not recommended. But many country housekeepers like to have on hand a home-made cordial. Cordials are usually made from sweet wine, and sweet wines always contain at least 18 per cent of alcohol. Dry wines may be used for cordials, though in this case the cordial is what is called a "bitter." The following recipe is a good one for making "Vermouth," a celebrated cordial or bitter:

Dry wine, one year or older	10	gallons.
Sweet oranges, thinly sliced	3	oranges.
Wormwood, powdered	1-10	pound.
Calaminth, ditto	1-10	pound.
Nutmeg, ditto	1-20	pound.
Cinnamon, ditto	1-10	pound.
Germander, ditto	1-10	pound.
Lesser Centaury, ditto	1-10	pound.
Elecampane, ditto	1-10	pound.
Gentian root, ditto	1-10	pound.

DIRECTIONS: Steep the herbs and spices in the wine for eight days. Then strain through muslin and bottle.

If a sweet cordial is wanted, add to the above one gallon of grape brandy and sugar to suit.

CIDER-MAKING.

Apple cider is a much more delicate liquor than either beer or wine. It requires a proportionally greater care in the making. For making good cider the fruit must be fully ripe, but not over-ripe. Cider can be made from summer, fall or winter apples, but as a rule only fall apples are used for this purpose. The best cider is made from the cultivated crab-apples. The best varieties of cider crabs are Transcendant, Red Siberian, and Maiden's Blush. The best of the standard varieties of apples for cider-making are Plumb's Cider, Smith's Cider, Buckingham, and Mother. Where the latter named varieties, or any of them, are used it will improve the quality of cider to add to the apples from one-fourth to one-eighth their amount in crabs. Where crabs are not available quinces may be used, but not more than 10 per cent of the latter.

Most American apples are lacking in tannin. To secure an additional amount of this and other substances necessary for a sound, long-keeping cider, for each two bushels of fruit add a small handful of clean apple leaves before crushing.

In the ordinary method of cider-making by small hand presses not more than 40 per cent of the juice in the fruit is removed from pomace, while only from one-third to one-half the sugar is recovered. Hydraulic presses extract about 75 per cent of the juice. By macerating the pomace and re-pressing we may secure practically all the juice and sugar as well as a greatly increased amount of the flavoring matter, aromatics and tannin, which are found chiefly in the skins and which can be dissolved out by water only at or near the boiling temperature.

The fruit should be crushed in a machine having wooden or copper-plated steel rollers, as iron reacts with the tannin of the fruit to darken the juice. Press for what juice can be secured. Remove the pomace and stir it thoroughly into clear, clean water which has been recently boiled and cooled to 75 or 80 degrees F. The temperature must not be above the latter figure. Use one gallon of water for each 40 pounds of pomace. Let macerate for twenty-four hours and then re-press and add the liquid to the first pressing. Return pomace again to the macerating vat and for each 40 pounds add one gallon of boiling water. Stir vigorously for two or three hours. Press again and add this liquid to the other pressings.

The best temperature for fermenting cider juice is between 68 and 78 degrees F. The nearer to 68 degrees F. the juice can be held the better the cider. On no account should the temperature go above 80 degrees F., as at that heat the yeast cells begin to die and this will produce a "stuck" vat. The casks and all utensils used in cider-making must be sweet, scrupulously clean and have been sterilized by means of sulphur fumes. "Sulphur matches," made especially for this purpose, can be had of most druggists, but a few pinches of powdered sulphur or "brimstone" placed on a hot shovel and the bunghole of the cask placed over it will serve as well. New casks, and old ones which have contained other liquids, should be placed in running water for several days before being used to store cider.

At 70 degrees F. the fermentation of cider is completed in about twenty-five days. But most people prefer their cider sweet; therefore the fermentation must be stopped before all the sugar is consumed. Usually about sixteen days actual fermentation will suffice. To stop the fermentation the juice must be rapidly cooled to below 60 degrees F.—the lower the better. The cooling paralyzes the yeast, which soon falls to the bottom of the cask. In fall months, when cider is usually made, the night temperature out of doors is below 60 degrees F., and the cider may be cooled by simply leaving it in open air. The clear juice must then be drawn off and "fined." To "fine" or clear cider we may use clay or tannin, preferably the latter. If clay is used three ounces will do for fifty gallons. Mix the clay with a quart of cider and stir slowly into cask. Then stir vigor-

ously or bung cask and roll about for a while to distribute the clay thoroughly. If tannin is used take for fifty gallons of juice one-half ounce tannin. Dissolve in a gill of brandy and stir slowly into cask. Then agitate again the cask as before. Let the fined cask stand for two weeks and then rack off the lees. The cider is now fit to drink. If the cider is to be bottled it must stand for another two weeks and be racked off once more. Use wine bottles or ordinary mineral-water bottles to keep the cider. Do not use wax on corks or tie them down with wire. Keep the stored cider in a dry, dark place having a temperature below 60 degrees F. Properly made cider stored either in glass or wood and kept below 60 degrees F. will keep sweet in full vessels for over a year.

The chief enemy of stored cider is the vinegar ferment—*Bacillus (Mycoderma) aceti.* This germ does not attack the cider until the alcoholic ferment has ceased to work. It will not grow in any case at a temperature below 60 degrees F. Hence the extreme importance of keeping cider below this temperature. Where the critical temperature must be overpassed, probably the best plan to prevent acetic fermentation is to add to the cask every month or two, one-half pound of the best white sugar dissolved in a half gallon of the cider and stirred slowly into the cask with subsequent agitation to distribute. The sugar keeps up a mild alcoholic fermentation, which in turn prevents acetic fermentation.

Where cider is used from the cask, to prevent spoiling in the partly empty cask pour upon the cider a quart of some tasteless vegetable oil such as olive or peanut oil. The oil will form a thin film on surface of cider and so prevent access of the acetic and putrefactive ferments always present in the air.

Pear cider, or "Perry," is made in exactly the same way as apple cider.

CIDER VINEGAR.

In the production of pure cider vinegar, four factors are concerned. These are:

1. Pure cider.
2. The presence of the acetic acid ferment, *Bacillus (Mycoderma) aceti.*
3. Free ingress of air.
4. Temperature of the air or room not less than 70 degrees F., nor more than 85 degrees F.

As vinegar is ordinarily made, cider is simply allowed to ferment spontaneously in unbunged barrels in a cellar the temperature of which during the fall months when cider is usually made is pretty constant at about 60 degrees F. The acetic acid ferment does not grow actively at any temperature below 70 degrees F. Hence the

relatively long period it requires to produce good vinegar in farm cellars.

Although the acetic ferment requires a comparatively high temperature, there are many other ferments which can grow at lower temperatures. These get into the farmer's vinegar barrels and make trouble. The following described process will enable any one to make a fine vinegar with the least possible waste of time and material.

Take sound barrels or any suitably-sized vessels of wood, earthenware or glass—never iron, copper, or tin. Clean thoroughly and scald. Fill not more than one-half full with "hard cider" stock, which should have fermented at least one month. To this add one-fourth its volume of old vinegar. This is a very necessary part of the process, since the vinegar restrains the growth of chance ferments which abound in the air, and at the same time it favors the true acetic acid ferment. Next add to the liquid a little "mother of vinegar." If this latter is not at hand, a fairly pure culture may be made by exposing in a shallow uncovered crock or wooden pail a mixture of one-half old vinegar and one-half hard cider. The room where this is exposed should have a temperature of about 80 degrees F. In three or four days the surface should be covered with a gelatinous pellicle or cap. This is the "mother of vinegar." A little of this carefully removed with a wooden spoon or a stick should be laid gently upon the surface of the cider prepared as above described. Do not stir it in. The vinegar ferment grows only at the surface. In three days the cap should have spread entirely over the fermenting cider. Do not break this cap thereafter so long as the fermentation continues. If the temperature is right the fermentation should be completed in from four to six weeks. The vinegar should then be drawn off, strained through thick white flannel, and the storage vessel corked or bunged tightly and kept in a cool place until wanted for consumption. If the vinegar remains turbid after ten days, stir into a barrel one pint of a solution of one-half pound of isinglass in one quart of water. As soon as settled, rack off and store in tight vessels. Usually no fining of vinegar is needed. No pure cider vinegar will keep long in vessels exposed to the air at a temperature above 60 degrees F.

"Vinegar eels" are sometimes troublesome in vinegar barrels. To remove these, heat the vinegar scalding hot, but do not boil. When cool, strain through clean flannel and the "eels" will be removed.

In making cider vinegar the strength of the product, or per cent by weight of the acetic acid in it, will be equal to or a little greater than the per cent by weight of the alcohol in the cider.

EVAPORATED FRUITS AND VEGETABLES.

The fruits most commonly evaporated are apple, peach, prune, blackberry, raspberry, and whortleberry. There is also a demand for evaporated vegetables, such as corn, sweet potato, and pumpkin. Of all evaporated fruits the apple is most popular and most extensively used.

Only good, sound fruit can be used. The apples are pared, cored and sliced or quartered by machines made for that purpose. The sliced or quartered fruit should be dropped for five minutes into a weak brine made by boiling one pound of salt in two gallons of clean, soft water. The brine prevents the fruit from discoloring. From the brine bath remove the fruit and place in shallow layers on a wire-bottomed or cloth tray. Most evaporators subject the fruit at this stage to fumes of burning sulphur to bleach it. But if the brine bath is used no sulphuring is necessary. Sulphur bleaches the fruit, but at the same time greatly decreases its food value and flavor. The brined fruit retains its natural color and fruity flavor. The salt used does not taste on the fruit. There are many styles of evaporators on the market, from the smaller affair to be set on the back of a cook-stove to the giant brick stack. All do good work.

The heat is always supplied by a furnace below the evaporating trays. In the best forms of commercial evaporators there is an elevating arrangement worked by a crank so that each fresh tray of fruit goes in at the bottom, and by turning the crank the whole superimposed stack of trays is moved up one notch to make room for the next tray. By the time the first tray reaches the top of the stack the fruit is dry. The machine is thus continuous and usually works night and day throughout the drying season. No evaporator having a capacity of less than twenty-five bushels of green fruit per day of twenty-four hours can be made to pay commercially. The larger the evaporator the less the cost per pound of finished product. A complete outfit, including paring and slicing machines for evaporating 100 bushels of apples daily, can be installed for about $500.

The following figures as to profits on evaporated fruit are approximately correct for North Carolina:

One bushel of fresh apples will produce 6½ pounds of dried fruit, worth about 50 cents, at cost of 10 cents for labor and fuel.

One bushel of peaches will produce 6 pounds of dried fruit, worth about 50 cents, at cost of 15 cents for labor, etc.

One hundred quarts of blackberries will produce 40 pounds dried fruit, worth $4, at cost of 50 cents for labor, etc.

One hundred quarts of black raspberries will produce 30 pounds dried fruit, worth $6, at cost of 40 cents for labor, etc.

One hundred quarts of whortleberries will produce 40 pounds dried fruit, worth $6, at cost of 25 cents for labor, etc.

PICKLED MEATS.

Corned Beef.—Beef for pickling should be as fresh as possible. The pieces should not be too large. Before placing the meat in the pickle, powder and rub it with the following composition: three parts of fine salt, one part of brown sugar, and one-eighth part of powdered acetate of soda. The pieces of meat, thoroughly rubbed with the above powder, are piled up or placed in a box, vat or barrel, and allowed to remain in the dry salt for eight days, but must be turned over every morning. At the end of the eight days remove the meat from the salting vessel and wash in cold water to remove all salt and clots clinging to the outside. Dry the meat for a short time and then place in a 25 per cent salt brine. In this brine it remains another eight days. It is then removed and washed. After removing from the brine and washing, the meat should be thoroughly air-dried and then hung in the smoke-house and exposed to cold smoke for forty-eight hours. This amount of smoking will give the meat a slight flavor of smoke, but a longer period may injure the flavor by giving an overdose of creosote. The meat may be allowed to hang in the smoke-house, but without smoke, until wanted for consumption. It may also be hung or stored in any dark, dry place well protected from insects.

Beef tongues are pickled and smoked in the same way as beef joints, but they should be allowed to remain in the brine for fifteen days and be turned over every third day. To enable the brine to penetrate better, the tongue should be punctured in several places with a wooden skewer or with a silver-plated or copper—not iron—fork.

Tripe.—The best tripe is made from the paunch or stomach of beef animals. The tripes should be thoroughly washed and scraped and then placed for twenty-four hours in running water. They should then be put into a heavy iron kettle or, better, an earthenware cooking-dish and simmered in one per cent salted water which has been aromatized with a little thyme or mint. In this vessel the tripe should remain for two or three hours. It is then removed and thoroughly dried, being covered with a clean cloth so as to cool slowly. The tripe at this stage of the process may be preserved in many different ways; but where it is to be consumed only after some considerable time, it is usually canned. In canning tripe and other meats, the temperature must be raised to 240 degrees F. At this temperature the cans or jars must be kept for half an hour for each pound of meat. In the Lyonnaise method of canning tripe it is, after the preliminary treatment as above, cut into small squares and placed in a frying-pan with some butter and large slices of onion, salt, pepper, and parsley to taste. In this pan it is cooked until well brown and

then while hot packed tightly into cans or jars, and sealed and processed as above stated. In the Flemish method the tripe is cut into narrow strips and placed in a porcelain vessel over a slow fire, and butter, chopped parsley, pepper, salt, and a little thyme are added, with flour sufficient to make a thin paste covering to the pieces of tripe. Add enough water to cover the whole and the juice of one lemon. Boil for one-fourth hour for each two pounds of tripe. Just before removing from the fire add the beaten yellows of three eggs. The tripe thus cooked is then placed in jars or cans and processed as stated.

MEAT PICKLE OR BRINE.

Each nation seems to have its own peculiar style of meat pickle. The following are some of the best formulas:

German Brine.—For each 26½ gallons of water, take salt, 83½ pounds; carbonate of soda, 20 ounces; and 2 ounces each of cumin and juniper berries. Bring this mixture slowly to the boiling point and carefully skim off all froth. Allow to cool before using.

English Brine.—For each 26½ gallons of water take 27½ pounds of salt, 50 pounds of brown sugar and 2¼ pounds of saltpeter. Place the following substances in a muslin bag: two ounces of juniper berries; 2 ounces of mace; 1 ounce of unground cloves; 1 ounce of thyme, and 1 ounce of cherry-laurel leaves. Place the bag of herbs, the salt, sugar, and saltpeter in the cold water and bring slowly to a boil. Allow it to cool before using, and when cool remove the bag containing the aromatics, and squeeze it thoroughly to extract all the juice.

French Brine.—For each 26½ gallons of water take 97 pounds of salt, 27 pounds of brown sugar, and 10 pounds of saltpeter. Place these substances in cold water and then add a muslin sack containing the following aromatics: two ounces of coriander; 1 ounce of cumin; 1 ounce of mace; 1 ounce of nutmeg; 1 ounce of clove-flowers; 10 ounces of an equal mixture of cherry-laurel leaves, thyme, sage, and sweet marjoram or summer savory. Bring slowly to a boil and boil five minutes.

Spanish Brine.—Five gallons of water, 5 gallons of red wine, 27 pounds of salt, 8 ounces of carbonate of soda, 25 ounces of saltpeter. Place all together in a pot and boil for ten minutes, then add 2½ pounds of ground white pepper and a muslin sack containing the following aromatics: three ounces of sweet basil and sage mixed in equal parts; 2 ounces of thyme and cherry-laurel mixed in equal parts; and if desired, a pinch of lavender and of rosemary. Cover the vessel and allow the aromatics to remain until the brine is cold. It is then ready for use.

Pickled Ham.—Trim the fresh hams to give them any desirable form, then beat them with a wooden mallet in order to free the veins from blood and favor the absorption of salt. Then rub them thoroughly with salt to which has been added a little saltpeter, or, if one prefers a mild cured ham, use pure cream of tartar instead of saltpeter. Pile and cover the salted hams and leave them to absorb the dry salt for two days, then turn them over, rub once more and let stand two days more and again repeat the rubbing with salt. After six days in the dry salt brush off all salt adhering to the outside, then place the hams in one or the other of the above-described pickles, according to taste. The German pickle is probably the best. Cover the pickling vat or barrel and keep it in the dark to prevent growth of molds. According to the size and weight of the hams they should remain from two to four weeks in the brine. They are then removed and washed in warm water, and with a stiff brush rub off all clotted blood and other impurities and make the ham as white as possible. In this condition they are hung in a well-ventilated, cool, dark place for eight days in order to dry out. At the end of this period of hanging the hams are rubbed with a mixture of rye or wheat flour and powdered soja bean or any yellow pea, so as to give them a yellowish color. They are then hung in the smoke-house, where they should be smoked with oak or hickory sawdust or chips, to which may be added as an aromatizer a handful of juniper berries or some aromatic wood according to taste—sassafras is preferred by many. The hams should hang in the smoke just long enough to give them a light-brown color. If allowed to remain until the hams become black, their flavor and edible value is very greatly injured. On removal from the smoke-house the hams should be hung again for a few days in a cool, dry place to dry off all moisture that may have been absorbed from the damp smoke. They may then be placed in canvas or paper sacks or placed in tight, clean boxes and packed with clean oats or bran, or dry oak or hickory sawdust, or dry wood ashes.

Pork shoulders are salted and smoked in the same way as hams. Other cuts of pork may be salted and smoked in the same way, but these cuts should not remain in the pickle longer than ten days.

Bacon.—Bacon is cured differently from ham in so far that saltpeter and sugar are never used. The pieces selected for bacon curing are rubbed with plain salt, which they are allowed to absorb for six days, being turned and rubbed every second day. They are then placed in a pickle without saltpeter—preferably the German style—for from four to six weeks, being turned once a week. At the end of this period they are removed from the brine and rubbed with a stiff brush to remove all adhering clots and are then dusted with a powder having the following composition: gypsum, 6 ounces; rye or other flour, 17 ounces; fine salt, 10 ounces; powdered cream of tartar,

½ ounce. Hang the pieces of bacon thus prepared in a dry, cool and dark room until they have thoroughly dried out. They are then lightly smoked, and when dried out the pieces are canvassed or may be packed away as above described in the case of hams.

SAUSAGE.

For the preparation of sausage, any kind of lean meat may be used, but all blood vessels and decayed parts must be first removed. The mixed meats should then be hashed in one of the many excellent meat-choppers on the market. The following are methods of preparing some celebrated styles of sausage:

Lyons Sausage.—Meats used in this kind of sausage must be of the best quality. Hams, chines, and rib pieces are most esteemed. Before chopping, the pieces are placed to soak for twelve hours in an aromatic mixture as follows: For each pound of meat take 2-3 of an ounce of fine salt, 1-30 of an ounce of white sugar, 1-15 of an ounce of ground white pepper and two cloves of garlic, or in the absence of garlic use a small onion. Chop the whole finely and put into a mixing bowl with 2 ounces of fat bacon, cut into small cubes or dice, for each pound of sausage meat. Mix the whole thoroughly and then proceed to fill into well-cleaned intestines or sausage casing, which should be cleaned and prepared in advance. When the casings are filled, they should be suspended for forty-eight hours in free air in order to permit moisture to evaporate. The sausages are then taken, one at a time, and squeezed strongly at the ends in order to force the sausage into a solid mass, and fill the space left by the evaporated moisture. The empty ends of the sausage cases may then be refilled or the binding cord may be moved up. The sausages are then to be suspended in a dry, well-ventilated place, where they may remain for four months, but will keep well for a year and a half.

Lyons sausage may be made equally well with an equal mixture of beef and pork. The sausage made in this way is ready for consumption after three months.

French Pork Sausage.—For making this sausage any kind of lean pork meat may be used. It should not be chopped too finely. For each 4 pounds of meat add 1-10 of an ounce of cream of tartar, 1-10 of an ounce of white sugar, 1 ounce of salt, 1-10 of an ounce of sweet marjoram, and 1-5 of an ounce of unground black pepper. Mix thoroughly and fill into well-cleaned casings and suspend for fifteen days in a cool, dry room, then compact the meat in casings and remove to a smoke-house and smoke with cold smoke until well blackened. When removing from the smoke-house, rub the outside with a little melted lard or a piece of fat, warm bacon. Roll each sausage separately in an envelope of paper and pack in boxes with dry wood ashes.

Spanish Sausage.—Spanish sausage is made entirely of pork. The meat is to be chopped not too finely and for each 2½ pounds is added ½ ounce of fine salt; 1-10 ounce of unground pepper; 1-10 ounce of powdered allspice; 1-30 ounce of yellow saffron; and a small pinch each of thyme, sage, and garlic. For each 25 pounds of the completed mixture, add 1 pint of sherry, brandy, or port wine. Mix thoroughly and fill into small sausage casing and hang the sausages in the drying-room for eight days, then smoke forty-eight hours. Wrap in greased paper and pack in wood ashes or dry oak sawdust.

THE PRESERVATION OF FISH.

As many farmers live near the seacoast or sounds where sea-fish is in season very cheap and abundant, a few words on the best methods of preserving this class of food will not be out of place.

All dead fishes tend to putrefy rapidly, and in this condition develop dangerous "ptomaines" or physiological poisons. Therefore fishes for canning, drying, or pickling should be as fresh as possible. Generally speaking, the methods of preserving fish are in all particulars similar to those used for preserving animal flesh. Fish cannot be canned at a temperature below 240 degrees F.

Kippered Herrings and Mullets.—The so-called "kippered" herrings are well liked by most persons. The following formulas have been found satisfactory in practice:

After scaling the herrings, remove the heads and gills, then remove the entrails without splitting the body. The dressed fishes are then plunged into plain cold brine containing 25 per cent of salt. Allow them to remain in this pickle for forty-five minutes. Remove from the brine, drain, and then arrange them preferably in flat boxes similar to those used for sardines, but any long box or jar may be used. For spicing the fish, add to the cans a little sage, thyme, parsley, tarragon, a few thin slices of onion and one or two pieces of dried citron or lemon peel. Then introduce into the jar as much as it will hold of juice made of one part boiled water and two parts cold vinegar. Close the jar or can and process the can at 240 degrees F. for five minutes for each pound of fish.

Another way of canning herrings, mullets, and other sea-fishes is as follows: After cleaning and trimming the fish as already stated, cut into transverse slices, rejecting the rib-bones, then place in cans or jars as stated before, and add the same amount of aromatics, but instead of using the liquor before mentioned, run in as much as the can will hold of hot melted butter. Then close and process the cans at 240 degrees F. ten minutes for each pound of fish.

The more common way of preserving herrings is, however, by simply salting them. We can recommend the following plan: Clean and scale the fishes and, without splitting, remove the heads, intestines, and gills. Pack the fishes closely (in layers) in barrels or kegs. Upon each layer of fishes dust a little ground black pepper, and lay on a few slices of onion and aromatic herbs according to taste. After the barrel or keg has been completely filled, head it up under pressure. Then through the bung run in as much as the vessel will take of the following liquor: One gallon of water; 1 gallon of pure cider vinegar; 2 pounds of salt, and 1-10 ounce of pure acetate of soda. Heat this brine to the boiling point and permit it to cool before using. After ten days in the brine the herrings are fit for consumption.

Smoked Herrings or "Bloaters."—For smoking, herrings must be absolutely fresh. Scale and split down belly, but do not remove heads. Remove gills and intestines. Make a brine of 20 parts salt to 100 parts water and add to it 1-10 ounce acetate of soda per quart. In this liquor soak the cleaned herrings for thirty minutes. Remove and flatten and hang them in a current of dry air so as to dry as quickly as possible. When well dried hang in smoke-house for twelve to fourteen hours, or until the herrings have acquired a bright, golden color. They may remain in the smoke-house—without smoke—or in any dry, dark room, until wanted, or they may be packed in boxes in dry wood ashes.

APPENDIX.

In many localities small farm canneries to work on fruit and vegetables will pay well. Commercial canning methods do not differ essentially from those described in this Bulletin, but tin cans are always used instead of glass jars.

The following estimates on canning machinery and outfits for a small commercial cannery are furnished us by a manufacturer of such goods:

Tomato and Fruit Canning Plant. Capacity 3,000 3-lb. cans, or 5,000 2-lb. cans per day. Kettles can be set in brick-work or attached to a steam boiler.

Process Kettle, 36 in. dia. x 35 in. deep	$ 18.00
Exhaust Kettle, 36 in. dia. x 24 in. deep	16.00
Scalding Kettle, 30 in. dia. x 24 in. deep	14.00
3 Sets Grate Bars, or 3 Steam Coils if Boiler is used 3 Furnace Doors,	15.00
2 Gasoline Fire-pots, complete	32.00
2 6-Tier Process Crates	14.00
2 1-Tier Exhaust Crates	7.00
1 Set of Crane Fixtures	10.00
4 Capping Machines	3.00
4 Capping Coppers	4.00
2 Tipping Coppers	1.00
2 Scalding Baskets	2.00
1 Forging Handle	.25
1 Forging Stake	2.50
1 Vise	2.50
¼ Doz. Files	1.35
2 Pr. Can Tongs	.70
1 Forging Hammer	1.00
1 Floor Truck	12.00
2 Doz. Peeling Knives	2.00
	$158.30

Estimate does not include steam boiler.

A 20-horse-power boiler would be required for the purpose. A building 20 x 45 feet would be a very suitable one for this plant. Boiler may be placed in this building or in a boiler-room adjoining.

MISCELLANEOUS SUPPLIES FOR COMMERCIAL CANNERS.

Acid, per carboy ($1.50 allowed for empties), 100 lbs.	$ 4.50
Air Gauges	3.00
Air Pump, Hand	7.00
Air Pump, Lever	12.00
Air Pump, Wheel	35.00
Paste, per half barrel	2.00
Sal Ammoniac, per lb	.20
Spelter, per lb	.07
Syrup Gauges	1.00

Very few canners now make their own cans. Can-making is a specialty carried on in large factories with aid of improved, patented machinery. As a rule, a cannery whose output does not exceed 5,000 cans daily can buy the cans cheaper than it can make them. Ready-made cans are sold at about $16 per 1,000 for 2-pound cans; $21.50 per 1,000 for 3-pound cans. By the car-load the cans cost a little less. They usually come packed in crates holding two dozen cans. The same crates are used to ship the packed goods in.

Solder costs 17 cents per pound; soldering fluid 32 cents per gallon. Labels are always lithographed in colors, showing the kind of fruit contained and the name and address of canner. Labels cost from $1.25 to $2 per 1,000.